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Scientists call for emergency response, as climate-triggered pest and disease invaders threaten US$5 billion cassava industry, heading for prime food security areas

(*March 16th 2016 - Hanoi, Vietnam*) - A new study published in Pest Management Science warns of devastating threats to cassava - a top starch-producing crop - creeping through Southeast Asia and heading for Indonesia, where cassava is a prime food.

Cassava, the third largest source of calories after rice and maize in the region, supports an estimated 40 million people. The crop underpins a US$5 billion market in starch, chips and other cassava products including biofuel. Southeast Asia is currently the world's largest trader of cassava starch.

"Our data suggests a devastating impact on Southeast Asian cassava production," said Dr. Kris Wyckhuys, entomologist for the International Center for Tropical Agriculture (CIAT). "It's vital that we act now to control these threats to safeguard food security, farmer welfare and the long-term sustainability of livelihoods and rural industries."

Rapidly emerging pests and diseases pose a severe threat to farmer's yields and incomes, he added. "What we found during this study is that some diseases and pests are far bigger problems than we thought. Alarmingly, they've also already spread further than previously thought."

Mysterious threats

For example, the enigmatic Cassava Witches' Broom disease, spread by an unknown insect - currently being investigated - has already reached the Philippines, Vietnam, Cambodia, Laos and Thailand, where it is wiping out annual incomes for farmers.

"Priorities and the level of urgency differ between countries and cassava-growing areas. But now we know for example that urgent action is needed to address Cassava Witches' Broom in Cambodia, and to halt the spread of cassava mealybug in Indonesia where it's moving into areas where cassava is a prime food security crop."

The study - the most up-to-date focusing on pest and disease invaders to Southeast Asia - gathered data from 430 fields across the region to track progress of new and old-time invaders to estimate pervasiveness of the threat, rather than determine yield loss, explained authors.

Monitoring revealed invading exotic species in endemic levels. Mealybugs were detected in 70 percent of all fields surveyed and Cassava witches' Broom disease was reported in 64 percent of plots - with around one third of all plants in those affected fields infested of infected.

Climate triggers

Dr. Ignazio Graziosi, a CIAT Research Fellow specialized in Invasive Species Ecology , said: "As far as pest invaders go, we're dealing with two groups: generalists, which attack other crops like coffee and tropical fruits as well, and comparative specialists, which attack primarily cassava. The study shows that occurrence of specialists is higher in farmer's fields, which means cassava is a prime target crop for those pests."

The study, conducted during the region's dry season, also points to climate change as a key driver in pest and disease outbreaks. Altering climatic conditions like more intense drought or flood periods, favor pest and disease development, and contribute to expanding geographical distribution of disease hosts and transmitting insects, say the authors.

"What we're seeing is that intensification of cropping systems, increased climate variability, and deficient crop management practices are aggravating both organism activity of pests and disease outbreaks, and crop susceptibility to new, invading threats," said Graziosi.

To make whole ecosystems more resilient to pests and disease invaders, the study calls for comprehensive integrated pest management, including biological control options. "What we're aiming for is practical, environmentally and economically-sustainable options for farmers, so they don't need to spend much money but get long-term results," Graziosi said.

Balanced ecosystems needed

"The aim is to create a balanced ecosystem, which is less vulnerable to pest invaders and the spread of pathogens. Research is crucial to determine how we can draw on already present natural enemies to clamp down on and fight new pest and disease invaders for example, and boost the natural health or 'immune system' of the whole ecosystem."

Biological control is already a reality in Southeast Asia, most recently in Vietnam and Indonesia, when a host-specific and minute killer wasp *Anagyrus lopezi,* was unleashed in 2013 and 2014 respectively to control mealybug outbreaks when they were first detected, drawing global media attention.

Dr Aunu Rauf, Professor of Agricultural Entomology at Indonesia's Bogor Agricultural University, said: "This study also outlines the real threat that mealybugs pose for poor farmers in Indonesia. Because the pest is from a foreign country, there is no natural enemy so it multiplies quickly.

Urgent action needed

"We've already planted the seed for long-term control not only for cassava mealybug, but for other invasive pests in the region. What we need right now is financial and technical support to roll-out a major biological control response program throughout the region, including equipment for diagnosis, detection and quarantine of emerging threats."

Deputy Director General at Vietnam's Plant Protection Research Institute, Dr. Trinh Xuan Hoat, said training courses will be critical to equip regional research communities with new knowledge about invading threats, some of which are currently unknown even within the scientific community.

"We consider cassava pests and diseases a new and severe problem for the region, not for any particular country, because they are easily spread from one country to another - naturally or by moving planting materials," he said. "Broad thinking is therefore needed and cross-border research cooperation is crucial to address these emerging threats," he added.

Notes for the editor:

The Emerging pests and diseases of cassava in Southeast Asia: Seeking eco-efficient solutions to overcome a threat to livelihoods and industries project was supported by the European Commission through the International Fund for Agricultural Development (IFAD) www.ifad.org

The International Center for Tropical Agriculture (CIAT) is a not-for-profit organization that conducts socially and environmentally progressive research aimed at reducing hunger and poverty and preserving natural resources in developing countries. www.ciat.cgiar.org

CGIAR In collaboration with national agricultural research systems, civil society and the private sector, the CGIAR fosters sustainable agricultural growth through high-quality science aimed at benefiting the poor through stronger food security, better human nutrition and health, higher incomes and improved management of natural resources. www.cgiar.org

The Plant Protection Research Institute (PPRI) is one of eighteen member institutions of the Vietnam Academy of Agricultural Sciences (VAAS), under the Ministry of Agriculture and Rural Development (MARD). The institute conducts research and technology transfer services in plant pathogens, pest diagnosis and identification, and is a CIAT partner. www.ppri.org.vn

Institut Pertanian Bogor (**IPB** or **Bogor Agricultural University**) is a state-run agricultural university based in the city of Bogor, Indonesia. CIAT and IPB are working in partnership to establish plans for mealybug control. www.ipb.ac.id